Exercise 2.4A

1 The three terms along each diagonal must add to give the same expression.

Complete the grid.

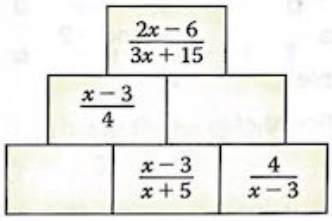
$\frac{2}{x}$		$\frac{3}{x}$
	$\frac{4}{x-6}$	
		$\frac{5}{x}$

2 The three terms along each side multiply to give $12x$.

Complete the grid.

$\frac{6}{x+1}$		$\frac{x+1}{5}$
$\frac{x+1}{3}$		15
	$\frac{x+1}{2x}$	

3 Complete this multiplication pyramid.



4 A linear sequence has first term $\frac{x+4}{3}$ and second term $\frac{x+5}{4}$.

Find the next term in the sequence.

5 Show that $\frac{1}{(x+1)(x+2)}$, $\frac{1}{(x^2+2x)}$ and $\frac{1}{x^2+x}$ are the first three terms of a linear sequence.

6 Amelia has tried to calculate

$\frac{2}{x-3} - \frac{3}{x+5}$ and $\frac{6}{x+4} + \frac{5}{x-2}$.

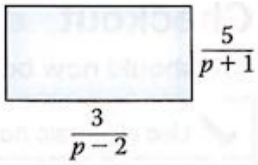
Both of her answers are wrong.

Correct Amelia's mistakes and find the correct answers.

$$\frac{2}{x-3} - \frac{3}{x+5} = \frac{2(x+5) - 3(x-3)}{(x-3)(x+5)}$$
$$= \frac{2x + 10 - 3x - 9}{(x-3)(x+5)}$$
$$= \frac{1-x}{(x-3)(x+5)}$$

$$\frac{6}{x+4} + \frac{5}{x-2} = \frac{6x - 2 + 5x + 20}{(x+4)(x-2)}$$
$$= \frac{11x + 18}{(x+4)(x-2)}$$

7 Here is a rectangle.

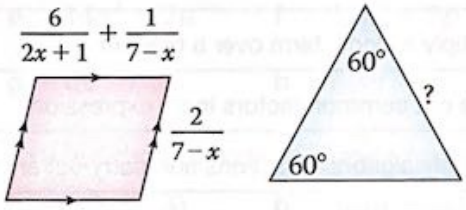


a Find an expression for the perimeter of the rectangle.

b Explain why p must be greater than -1.

c Explain why p cannot equal 2.

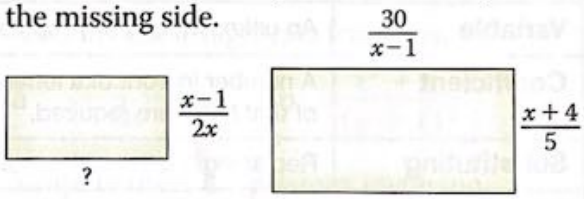
8



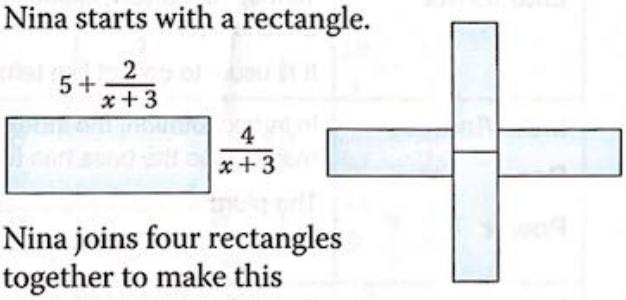
The perimeter of the parallelogram is equal to the perimeter of the triangle.

Show that the unknown side of the triangle has length $\frac{30}{(2x+1)(7-x)}$.

9 The large rectangle is an enlargement of the smaller rectangle. Find the length of the missing side.



10 Nina starts with a rectangle.



Nina joins four rectangles together to make this composite shape. Show that the perimeter of Nina's shape is $\frac{8(5x+18)}{x+3}$.

11 Find the mean of these three numbers.

$\frac{x-1}{12}$ $\frac{x+2}{6}$ $\frac{x}{4}$

12 **a** Show that

$$\frac{3x+6}{x-1} \times \frac{2x-2}{5x+20} \times \frac{5x-15}{x+2} \times \frac{x+4}{6x-18} = 1$$

b Fill in the blanks to make the equation correct.

$$\frac{\square}{6x-3} \times \frac{6-3x}{2x+8} \times \frac{3x+15}{\square} \div \frac{6x+30}{2x-1} = 1$$

1 The three terms along each diagonal must add to give the same expression.

Complete the grid.

$\frac{2}{x}$		$\frac{3}{x}$
	$\frac{4}{x-6}$	
		$\frac{5}{x}$

$$\frac{2}{x} + \frac{4}{x-6} + \frac{5}{x}$$

$$= \frac{2(x-6) + 4x + 5(x-6)}{x(x-6)}$$

$$= \frac{2x - 12 + 4x + 5x - 30}{x(x-6)}$$

$$= \frac{11x - 42}{x(x-6)}$$

$$\frac{11x - 42}{x(x-6)} - \frac{4}{x-6} - \frac{3}{x}$$

$$= \frac{11x - 42 - 4x - 3(x-6)}{x(x-6)}$$

$$= \frac{11x - 42 - 4x - 3x + 18}{x(x-6)}$$

$$= \frac{4x - 24}{x(x-6)} = \frac{4(x-6)}{x(x-6)} = \frac{4}{x}$$

---

2 The three terms along each side multiply to give $12x$.

Complete the grid.

$\frac{6}{x+1}$	$10x$	$\frac{x+1}{5}$
$\frac{x+1}{3}$		15
$6x$	$\frac{x+1}{2x}$	$\frac{4x}{x+1}$

$$\frac{12x}{1} \div \frac{6}{x+1} \div \frac{x+1}{5}$$

$$= \frac{\overset{2}{\cancel{12}}x}{1} \times \frac{\cancel{(x+1)}}{\cancel{6}_{1}} \times \frac{5}{\cancel{(x+1)}}$$

$$= \frac{10x}{1} = 10x$$

$$\frac{12x}{1} \div \frac{6}{x+1} \div \frac{x+1}{3}$$

$$= \frac{\overset{2}{\cancel{12}}x}{1} \times \frac{\cancel{(x+1)}}{\cancel{6}_{1}} \times \frac{3}{\cancel{(x+1)}}$$

$$= \frac{6x}{1} = 6x$$

$$\frac{12x}{1} \div \frac{x+1}{2x} \div \frac{6x}{1}$$

$$= \frac{\overset{2}{\cancel{12x}}}{1} \times \frac{2x}{x+1} \times \frac{1}{\cancel{6x}_{1}}$$

$$= \frac{4x}{x+1}$$

Check $\frac{4x}{\cancel{(x+1)}} \times \frac{\overset{3}{\cancel{15}}}{1} \times \frac{\cancel{(x+1)}}{\cancel{5}_{1}} = 12x$ ✓

---

3 Complete this multiplication pyramid.

	$\frac{2x-6}{3x+15}$	
$\frac{x-3}{4}$	$\frac{4}{x+5}$	
$\frac{x+5}{4}$	$\frac{x-3}{x+5}$	$\frac{4}{x-3}$

$$\frac{x-3}{4} \div \frac{x-3}{x+5}$$

$$= \frac{\cancel{(x-3)}}{4} \times \frac{(x+5)}{\cancel{(x-3)}} = \frac{x+5}{4}$$

$$\frac{\cancel{(x-3)}}{x+5} \times \frac{4}{\cancel{(x-3)}} = \frac{4}{x+5}$$

Check $\frac{x-3}{\cancel{4}} \times \frac{\cancel{4}}{x+5} = \frac{x-3}{x+5} \neq \frac{2x-6}{3x+15}$

$$= \frac{2(x-3)}{3(x+5)}$$

Book Question is Wrong
